attachment to interview Summary of 3/16/2010

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TO:	Examiner - Marianne L. Padgett	**NUMBER OF PAGES (INCLUDING THIS TRANSMITTAL SHEET):**	16
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DATE:	March 11, 2010		
FROM:	Mark J. Murphy		
REFERENCE:	Applicant: Shinji Maekawa et al. - Serial No. 10/827,457 Title: "Method For Forming Pattern And Drop Discharge Apparatus"		
MESSAGE:	Please see attached		

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Attorney Docket No.: 0553-0408

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)
Shinji MAEKAWA et al.	)
Serial No.: 10/827,457	)
Filed: April 19, 2004	)
For: Method For Forming Pattern And Drop Discharge Apparatus	)
Examiner: Marianne L. Padgett	)
Art Unit: 1792	)
Confirmation No.: 2984	)

Commissioner for Patents
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PROPOSED AMENDMENT I (for interview purposes only)

In response to the Office Action of December 18, 2009, Applicants wish to discuss the following possible amendment and the following points:

IN THE SPECIFICATION:

Please replace the paragraph at page 19, line 22 - page 20, line 6 with the following amended paragraph:

After that, in order to improve the contact property, plasma of oxygen, nitrogen, helium or the like is irradiated by a plasma irradiation and drop discharge means 13 having plural plasma irradiating ports and composition discharge ports arrayed in a uniaxial direction, and then a resist composition is selectively discharged to form a mask pattern 14 for forming a gate electrode on the conductive film 11, as shown in Fig.8(B). In this case, since the drop discharge means has the discharge ports arrayed only in a uniaxial direction, it suffices to operate heads only at required positions (13a). To process the entire surface of the substrate, one or both of the substrate 10 and the plasma processing means and drop discharge means 13 may be moved. Such processing is similarly performed in the following steps.

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) A pattern forming method comprising steps of:

forming a liquid-repellent thin film on an electrically insulating surface, the liquid-repellent thin film being repellent to a liquid composition;

~~horizontally moving~~ positioning the glass substrate, a first nozzle and a second nozzle, ~~which~~ are the first and second nozzles being integrated, [[to]] so that the first nozzle and the second nozzle are in a region located above a selected portion of the liquid-repellent thin film ~~with a spacing between the integrated first nozzle and second nozzle, and the thin film~~;

irradiating the selected portion of the liquid-repellent thin film with a plasma of a gas originating from the first nozzle to selectively provide affinity for the liquid composition to the selected portion, after the step of ~~horizontally~~ moving the integrated first nozzle and second nozzle; and

applying ~~a drop of a~~ the liquid composition to the selected portion ~~irradiated with plasma~~ by discharging a drop from the second nozzle by drop discharging method, after ~~irradiating~~ having irradiated the ~~first~~ selected portion with the plasma,

wherein a predetermined pattern is formed by repeating said steps of ~~moving~~ positioning, irradiating, and applying. [[.]]

2. (Currently amended) A pattern forming method comprising:

forming a thin film having affinity for a liquid composition on an electrically insulating

surface;

~~horizontally moving~~ positioning the electrically insulating surface, a first nozzle and a second nozzle, ~~which are~~ the first and second nozzles being integrated, [[to]] so that the first nozzle and the second nozzle are in a region located above a ~~first~~ selected portion of the thin film ~~with a spacing between the integrated first nozzle and second nozzle, and the film~~;

selectively irradiating the ~~first~~ selected portion of the thin film with a plasma of a gas originating from the first nozzle to form a ~~first~~ groove or a ~~first~~ hole in the ~~first~~ selected portion or to modify the surface roughness of the selected portion, after the step of ~~horizontally~~ moving the integrated first nozzle and second nozzle;

forming a ~~first~~ pattern by applying to the selected portion ~~drop discharging method in which a~~ the liquid composition by discharging a drop ~~is dropped to the first groove or the first hole in the first selected portion of the thin film from~~ from the second nozzle after ~~irradiating~~ having irradiated the ~~first~~ selected portion with the plasma[[;]].

wherein a predetermined pattern is formed by repeating said steps of ~~moving~~ positioning, irradiating, and applying.

~~horizontally moving the integrated first nozzle and second nozzle to a second selected portion of the thin film with a spacing between the integrated first nozzle and second nozzle, and the thin film, after forming the first pattern;~~

~~selectively irradiating the second selected portion of the thin film with plasma from the first nozzle to form a second groove or a second hole in a surface of the second selected portion after step of horizontally moving the integrated first nozzle and second nozzle; and~~

~~forming a second pattern by drop discharging method in which applying a drop of the liquid~~

~~composition is dropped to the second groove or the second hole in the first second selected portion of the thin film from the second nozzle after irradiating the second selected portion with plasma[[.]];~~

~~wherein the first pattern and the second pattern can be configured to join with each other or to separate each other.~~

3. (Previously Presented) A pattern forming method according to claim 1, wherein the liquid composition comprises at least one selected from the group consisting of a conductive material, a resist material, a polymer material and a light emitting material.

4. (Previously Presented) A pattern forming method according to claim 1, wherein the liquid-repellent thin film is selected from the group consisting of a semiconductor film, a conductive film and a polymer film.

5. (Currently Amended) A pattern forming method according to claim 2, wherein the thin film having affinity for a liquid composition is selected from the group consisting of a silicon oxide film, silicon nitride film, a silicon oxynitride film and a metal oxide film.

6. (Previously Presented) A pattern forming method according to claim 1, wherein the irradiation with the plasma is performed at a pressure in a range of 1.3×10^1 to 1.31×10^5 Pa.

7-15. (Canceled)

16. (Previously Presented) A pattern forming method according to claim 2, wherein the liquid composition comprises at least one selected from the group consisting of a conductive material, a resist material, a polymer material and a light emitting material.

17. (Previously Presented) A pattern forming method according to claim 2, wherein the plasma irradiation is performed at a pressure in a range of 1.3×10^1 to 1.31×10^5 Pa.

18-22. (Canceled)

23. (Currently amended) A pattern forming method comprising steps of:

~~horizontally moving~~ positioning a surface, a first nozzle and a second nozzle, ~~which are~~ the first and second nozzles being integrated, [[to]] so that the first nozzle and the second nozzle are in a region located above a ~~first~~ selected portion of [[a]] the surface ~~with a spacing between the integrated first nozzle and second nozzle, and the surface~~;

irradiating the selected portion of the surface with a plasma of a gas originating from the first nozzle to selectively provide affinity for a liquid composition having electrical conductivity, after the step of ~~horizontally~~ moving the integrated first nozzle and second nozzle;

forming a conductive film by applying [[a]] the liquid composition having electrical conductivity to the selected portion ~~irradiated with plasma~~ by discharging a drop from the second nozzle by drop discharging method, after ~~irradiating~~ having irradiated the selected portion with the plasma;

forming a mask pattern made of a resist composition over the selected portion; and

etching the conductive film selectively according to the mask pattern to form a conductive pattern by ~~pattern having conductivity in the selected portion using the mask pattern~~,

wherein a predetermined wiring pattern is formed by repeating said steps of ~~moving~~ positioning, irradiating, applying, mask pattern forming, and etching.

24. (Previously presented) A pattern forming method according to claim 23, wherein the gas is selected from the group consisting of He, Ne, Ar, Kr, Xe, oxygen, nitrogen and a combination thereof.

25. (Previously presented) A pattern forming method according to claim 23 wherein the mask pattern is formed by selectively applying the resist to the conductive pattern through a nozzle.

26. (Currently amended) A pattern forming method comprising steps of:

~~horizontally moving~~ positioning a surface, a first nozzle and a second nozzle, ~~which are~~ the first and second nozzles being integrated, [[to]] so that the first nozzle and the second nozzle are in a region located above a selected portion of [[a]] the surface ~~with a spacing between the integrated first nozzle and second nozzle, and the surface~~;

selectively irradiating the ~~first~~ selected portion with a plasma of a gas originating from the first nozzle to form a groove in the selected portion ~~of the surface~~ or to modify the surface roughness of the selected portion, after the step of ~~horizontally~~ moving the integrated first nozzle and second nozzle;

forming a conductive film by applying a liquid composition comprising a conductive material

to the selected portion ~~to the groove~~ by discharging a drop from the second nozzle by drop discharging method, after having irradiated ~~irradiating~~ the first selected portion with the plasma;

forming a mask pattern made of a resist composition over the selected portion ~~groove~~ after having performed ~~performing~~ the drop discharging method; and

etching the conductive film selectively according to the mask pattern to form a conductive pattern by ~~pattern having the conductive material using the mask pattern~~,

wherein a predetermined wiring pattern is formed by repeating said steps of ~~moving~~ positioning, irradiating, applying, mask pattern forming, and etching.

27. (Previously Presented) A pattern forming method according to claim 26 wherein the gas is selected from hydrogen, CF_4, NF_3, SF_6, oxygen and a combination thereof.

28. (Previously Presented) A pattern forming method according to claim 26 wherein the mask pattern is formed by selectively applying the resist to the conductive pattern through a nozzle.

29. (Previously Presented) A pattern forming method according to claim 1, wherein the application of the liquid composition is performed at a pressure in a range of 1.3×10^1 to 1.31×10^5 Pa.

30. (Previously Presented) A pattern forming method according to claim 2, wherein the application of the liquid composition is performed at a pressure in a range of 1.3×10^1 to 1.31×10^5 Pa.

31. (New) A pattern forming method according to claim 23, wherein the etching is performed by locally discharging plasma from plural plasma discharge ports.

32. (New) A pattern forming method according to claim 26, wherein the etching is performed by locally discharging plasma from plural plasma discharge ports.

REMARKS

Interview

Applicants appreciate the Examiner agreeing to a personal interview on March 16, 2010 at 10:45 am to discuss the objections and rejections in the Office Action. Applicants wish to discuss the following with the Examiner at the interview.

Applicants will address each of the objections and rejections in the order in which they appear in the Office Action.

Claim Rejections - 35 USC §112, Second Paragraph

In the Office Action, Claims 1-6, 16-17 and 23-30 are rejected under 35 USC § 112, second paragraph as being indefinite. Applicants propose to amend the claims to overcome this rejection.

Initially, Claims 1 and 2 are objected to for the phrase "an **insulating** surface." The Examiner states that it is not known if this is electrically, thermally, etc. Accordingly, Applicants are amending "an insulating surface" to "an electrically insulating surface". The field of the invention and the embodiments in the specification (for example, fabrication of a thin film transistor) make it clear that "insulating surface" should be read "electrically insulating surface." For example, page 3 lines 4-8 in the specification recite a "glass substrate" which is an electrically insulating substrate.

In order to address the other objections to the claims, Applicants are amending Claim 1 as follows (reference is to the lines in the claims in Amendment H filed 11/23/09 which are referenced in the objection; Applicants are addressing each of the specific objections in order as listed in the rejection):

Line 10, changing "a liquid composition" to "the liquid composition";

Line 8, changing "affinity for liquid" to "affinity for the liquid composition";

Lines 11-12, changing "the first selected portion" to "the selected portion"

Lines 10-12, changing "applying a drop of a liquid composition to the selected portion irradiated with plasma from the second nozzle by drop discharging method, after irradiating the first selected portion with plasma," to "applying the liquid composition to the selected portion by discharging a drop from the second nozzle by drop discharging method, after having irradiated the selected portion with the plasma,";

Line 1, changing "comprising" to "comprising steps of"; and

Deleting the extra period;

Applicants are amending Claim 2 as follows:

Line 2, changing "affinity for a liquid" to "affinity for a liquid composition"; and

Last 2 lines, deleting the last "wherein" clause.

Applicants are amending Claim 23 to recite "a conductive pattern" and to distinguish "a mask pattern" from "a conductive pattern". Claim 26 has been amended in a similar manner.

Applicants are also amending the clause in Claim 1 related to nozzles as follows: "~~horizontally moving~~ positioning the glass substrate, a first nozzle and a second nozzle, ~~which are~~ the first and second nozzles being integrated, [[to]] so that the first nozzle and the second nozzle are in a region located above a selected portion of the liquid-repellent thin film ~~with a spacing between~~

~~the integrated first nozzle and second nozzle, and the thin film.~~" Support for this amendment can be found, for example, in Figs 1, 2, 4, 5 and 7 and in the specification at page 6, line 19 to page 7, line 10. Similar amendments are being made to independent Claims 2, 23, and 26.

Applicants are further amending Claims 2 and 26 to recite "...to form a groove or a hole in the selected portion, or to modify the surface roughness of the selected portion..." This feature is supported by, for example, page 8 lines 20-25 of the specification. (Applicants note that the specification recites "surface asperity." Applicants are reciting "surface roughness" in the claim to improve clarity).

These amendments should overcome the §112, second paragraph rejection.

Objection To Disclosure

The Examiner objects to the disclosure for informalities therein, particularly the paragraph bridging pages 19-20 and the recital of the drop discharge means 13.

Therefore, Applicants propose to amend the specification in the paragraph bridging pages 19-20 to recite:

> "After that, in order to improve the contact property, plasma of oxygen, nitrogen, helium or the like is irradiated by a plasma irradiation and drop discharge means 13 having plural plasma irradiating ports and composition discharge ports arrayed in a uniaxial direction..."

It is respectfully submitted that this amendment is consistent with the overall disclosure of the present application which describes integrated nozzles to perform plasma treatment and

composition discharge. See e.g. Fig. 7 in the present application.

Therefore, this amendment should overcome the objection to the disclosure.

Claim Rejection – 35 USC §112, first paragraph

The Examiner also rejects Claims 2, 5, 16-17 and 30 under 35 USC §112, first paragraph, as failing to comply with the written description requirement. In particular, the Examiner objects to the claim language "wherein the first pattern and the second pattern can be configured to join with each other or to separate each other" in Claim 2 as being new matter.

Applicants propose to delete this phrase which should overcome this rejection

Claim Rejections – 35 USC §103

The Examiner rejects Claims 1-6, 16-17 and 29-30 under 35 U.S.C. §103(a) as being unpatentable over Kiguchi et al. (US 6,599,582) and further in view of Di Dio (US 2004/0152329), optionally considering Lewis et al. (US 5,272,979), rejects Claims 1, 3-4, 6 and 29 under 35 U.S.C. §103(a) as being unpatentable over Kiguchi et al., optionally considering Lewis et al. (US 5,272,979), rejects Claims 23-28 under 35 USC §103(a) as being unpatentable over Kiguchi in view of Di Dio, optionally considering Lewis, further in view of Yamazaki et al. (US 7,189,654). These rejections are respectfully traversed.

In particular, Kiguchi does not appear to disclose or suggest the claimed feature of "a first nozzle and a second nozzle, the first and second nozzles being integrated" as recited in the amended claims. While Kiguchi discusses moving "ink-jet systems" and "treatment means", integration of those two apparatus is neither disclosed nor suggested in Kiguchi. For example, Figs. 19 and 20 of

Kiguchi illustrate structures of ink-jet systems, but no combination with a treatment means is shown. In addition, the block diagrams of Figs 1-7 show ink-jet systems separated from treatment means.

The other cited references also do not appear to disclose this claimed feature.

In addition, amended Claims 2 and 26 both recite "to form a groove in the selected portion or to modify the surface roughness of the selected portion" and also "forming a pattern by applying, to the selected portion, the liquid composition". Figure 2 provides illustration of the intended meaning of these features. None of the cited references appear to disclose or suggest this combination of features.

Furthermore, while Kiguchi discusses plasma treatments (see e.g. col. 11 lines 22-52 in Kiguchi), none of these treatments achieve the steps recited in the claims. Di Dio appears to be directed to bank structures, which are not used in the claimed invention.

It is respectfully submitted that the claims as amended are not disclosed or suggested by the cited references and are patentable thereover.

Double Patenting

Claims 23-28

The Examiner further rejects Claims 23-28 on the grounds of non statutory obviousness-type double patenting as being unpatentable over Claims 1-24 of Yamazaki (U.S. 7,189,654) in view of Kiguchi further in view of Di Dio, optionally considering Lewis et al. This rejection is also respectfully traversed.

As explained above, Applicants are amending independent Claims 23 and 26.

In light of this amendment, it is respectfully submitted that there is no double patenting.

Claims 1-6, 16-17 and 23-30

Claims 1-6, 16-17 and 23-30 are rejected on the ground of non statutory obviousness-type double patenting as being unpatentable over Claims 1-16 of U.S. 7,625,493 in view of Kiguchi further in view of Di Dio, optionally considering Lewis et al.

As explained above, Applicants are amending independent Claims 1, 2, 23 and 26.

In light of this amendment, it is respectfully submitted that there is no double patenting.

Conclusion

It is respectfully submitted that the present application is in a condition for allowance and should be allowed.

If any fee should be due for this amendment, please charge our deposit account 50/1039.

Favorable reconsideration is earnestly solicited.

Dated

Respectfully submitted,

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